

06/01/00

P19246.P01

# UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.

P19246

Total Pages

Inventor(s) or Application Identifier  
Heinz KETTLER

Title: VEHICLE STEERING HEAD

JC643 U.S. PTO  
09/584497

06/01/00

ADDRESS TO:

Assistant Commissioner for Patents  
Box Patent Application  
Washington, DC 20231

## APPLICATION ELEMENTS

## ACCOMPANYING APPLICATION PARTS

1. ☒ Fee Transmittal Form
2. ☒ Specification [Total Pages 29 ]  
(preferred arrangement set forth below)
  - Descriptive title of the Invention
  - Cross References to Related Applications
  - Statement Regarding Fed sponsored R & D
  - Reference to Microfiche Appendix
  - Background of the Invention
  - Brief Summary of the Invention
  - Brief Description of the Drawings (if filed)
  - Detailed Description
  - Claim(s)
  - Abstract of the Disclosure
3. ☒ Drawing(s) (35 USC 113) [Total Sheets 9 ]
4. ☒ Oath or Declaration [Total Pages 3 ]
  - a. ☒ Newly executed (original or copy) ☐ Unexecuted
  - b. ☐ Copy from a prior application (37 CFR 1.63(d))  
(for continuation/divisional with Box 18 completed)  
[Note Box 5 below]
    - i. ☐ DELETION OF INVENTOR(S)  
Signed statement attached deleting inventor(s)  
named in the prior application, see 37 CFR 1.63(d)(2)  
and 1.33(b).
- ☐ Incorporation By Reference (useable if Box 4b is checked)  
The entire disclosure of the prior application, from which a copy  
of the oath or declaration is supplied under Box 4b, is considered  
as being part of the disclosure of the accompanying application  
and is hereby incorporated by reference therein.
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  - c. ☐ Statement verifying identity of above copies

8. ☒ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney  
(when there is an assignee)
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11. ☐ Information Disclosure ☐ Copies of IDS Citations  
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☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior Application No. \_\_\_\_\_/\_\_\_\_\_, filed \_\_\_\_\_.
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TITLE OF THE INVENTION

**VEHICLE STEERING HEAD**

INVENTOR

Heinz KETTLER

P19246.S02

## VEHICLE STEERING HEAD

### CROSS-REFERENCE TO RELATED APPLICATIONS

5 The present application claims priority under 35 U.S.C. § 119 of German Patent Application No. 299 11 652.2, filed on July 5, 1999, the disclosure of which is expressly incorporated by reference herein in its entirety.

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

10 The present invention relates to a vehicle steering head and in particular, to a steering head for a vehicle comprising a support tube which has rotatably supported therein a fork tube to which a wheel cover and a handlebar can be secured.

#### 2. Discussion of Background Information

15 Vehicle steering heads of the above-described type are in particular used in bicycles or tricycles, and in particular in tricycles or bicycles for children.

20 In devices of the above-described type it is desirable for safety reasons that accidents be avoided which may be caused by an excessively large handlebar deflection. It has been found that when there is an excessively large handlebar deflection (e.g., the handle bar rotates beyond a point where effective steering occurs), the vehicle may tilt to the side. Moreover, such deflections or excessive rotation may run the risk that a user impacts his body against the handlebar. Additionally, the user may get caught with his/her feet in the front wheel and may be even be injured by the pedals.

25 A further drawback or disadvantage of prior-art devices occurs when they are pushed with a push rod type device. In such cases, these devices have a tendency

towards uncontrolled steering movements of the front wheel which cannot be mastered or effectively controlled by small children, in particular.

### SUMMARY OF THE INVENTION

5           The present invention therefore provides a vehicle steering head of the above-mentioned type which is of a simple construction and which can operate in an easy and reliable manner. Moreover, this design avoids the drawbacks of the prior art and can in particular limit a handlebar deflection to a desired degree. The invention also has provision for locking the handlebar.

10           According to one aspect of the invention a latch element is secured to a fork tube on a portion provided inside the support tube. A linkage element is supported in the support tube for rotation therewith. The linkage element is displaceable or moveable in a longitudinal direction of the support tube. The linkage element comprises at least one stop surface which limits a rotation of the fork tube and can be brought into contact with the latch element. Moreover, the linkage element comprises at least one locking element which is releasably connectable to the latch element.

15           According to another aspect of the invention a latch element is supported on the support tube. A linkage element is arranged on the fork tube and connected to the tube for rotation therewith. The latch element is freely displaceable or moveable along the support tube. The linkage element comprises at least one stop surface which limits a rotation of the fork tube and can be brought into contact with the support tube. Moreover, at least one latch element is provided that is releasably connectable to the support tube.

20           The vehicle steering head according to the invention is characterized by a number of considerable advantages.

First of all, it is possible to install or utilize the steering head in a frame of any desired design, e.g. children's bicycles or tricycles. Ideally, the dimensions of the steering head are such that they do not interfere with the remaining structure of the frame within which it is installed. Of course, the steering head may be combined with any and all common types of frames where ever its advantageous design is desired. Accordingly, the steering head may be utilized in a variety of devices where limited deflection or rotation and/or locking are desired.

Because the invention utilizes a latch element which is arranged in the support tube, no functional parts of the steering head need be outwardly visible or accessible. Accordingly, the internal parts are less susceptible to damage. Additionally, this design is less likely to cause injury when used by children or infants.

As a result of utilizing a linkage element according to the invention, it is possible to reliably lock the fork tube and thus the wheel fork and the front wheel. Such a locking provision is easily be accomplished by displacing or moving the linkage element. This design ensures a high degree of operational safety and operational reliability.

The linkage element preferably utilizes stop surfaces which cooperate with the latch element in a manner where they are brought into contact with one another. In this way, the steering angle can be limited to a particularly or desired range. This limited range of motion of the steering angle can be realized according to the invention in different ways. The invention contemplates that the available steering angle is freely selectable within a wide desired range. This is of particular advantage to vehicles for children such as tricycles, which may require a steering angle of approximately 45° to each side. Of course, other desirable steering angles cab be utilized. However, by designing in the desired limited steering angle, lateral tilting of the tricycle or similar devices can be prevented or its risk significantly reduced.

Additionally, the risk of injuries which may be caused by the pedals, e.g., devices which utilize pedals on the front wheel can be reduced. Finally, the risk of injury which can occur when the handlebar exceeds a controlled steering angle can be ruled out to a considerable extent.

5           The invention also provides for a linkage element having a locking element which is releasably connectable to the latch element. This design ensures that when a push rod is used for pushing the device, i.e., a tricycle, the front wheel thereof may be reliably locked in place during straight travel.

10           In an advantageous embodiment of the invention, the latch element is designed in the form of a pin which extends in a direction transverse to the fork tube. The pin may extend through the fork tube such that it projects at both sides of the fork tube. Alternatively, the pin can project from the fork tube on only one side. Moreover, the pin can be firmly connected to the fork tube, e.g. by welding or other conventional attachment techniques. Additionally, it may be secured by press fitting with or without utilizing a knurled portion. Of course, the dimensions of the pin can easily be adapted to the respective conditions of use.

15           It should be noted that the manufacturing costs of the steering head are reduced by the above-described construction to quite a considerable degree.

20           In another advantageous embodiment of the invention, the linkage element is substantially designed in the form of a hollow cylinder. Thus, the linkage element can be reliably guided in the support tube and surround the fork tube. Additionally, the linkage element can be designed as a single integral part or several parts which are either joined together or which cooperate together.

25           It is advantageous for the longitudinal displacement or movement of the linkage element to be along an axis of the support tube and the fork tube. Accordingly, the support tube may comprise at least one longitudinal slot or a similar

recess through which a connection element extends which is connected to the linkage element. This design also utilizes a slide which is arranged outside the support tube.

The slide facilitates the ease of handling or movement of the linkage element. In such a design, a displacement of the slide, which may additionally be provided with locking mechanism or fixing safety mechanism, effects a corresponding displacement or movement of the linkage element. The locking mechanism or fixing mechanism allows for fixing the front wheel in a single or set travel position which is preferably straight. Moreover, the invention also contemplates that the linkage element may be provided with inclined inlet surfaces or intercepting mechanisms which engage the latch element so as to initiate a locking action when the front wheel is slightly deflected angularly.

Stop surfaces on the latch element are preferably formed on at least one front attachment of the linkage element. Additionally, it is particularly advantageous when two opposite attachments or stops are in symmetry with each other and are each provided with at least one stop surface located on the linkage element. Thus, by utilizing two attachments or stops which are in symmetry with each other, this design can limit the steering angle in a symmetrical fashion to both the left and the right side.

In another advantageous embodiment of the invention, the associated stop surfaces of the attachments or stops act to limit the rotation of the fork tube to a predetermined angular range at both sides. This angular range may e.g. be approximately 45° to both sides, for a total range of motion of approximately 90°.

The locking element is preferably designed in the form of at least one front recess which receives the latch element. Such an advantageous design makes it possible to grip and fix the latch element upon displacement or movement of the linkage element. Additionally, it is advantageous that the recess is retracted or set back relative to the front attachment, so that the attachments or stops can always

remain in the plane of the latch element, while upon a displacement of the latch element, it is only the recess which can additionally be brought into engagement.

To implement a simple and operationally reliable structure of the steering head, it may be of advantage that the recess be centrally arranged between the two attachments or stops.

The invention also contemplates that the fork tube itself has not been changed constructionally. In other words, the invention can be adapted to work with a conventional fork tube. Also, the invention makes it possible to manufacture all functional parts separately in a very simple manner. As a result, advantageous production costs can be achieved.

In a preferred design of a previously described embodiment, the linkage element is designed as part of a mudguard which extends from below into the support tube. This design allows for significant cost savings since the mudguard is normally made from plastics and is typically already included in most vehicles of the above-described type. The linkage element can thus be mounted on the mudguard or made integrally therewith, in a particularly easy way and at low costs.

A further advantage of the this embodiment is that the latch element can be designed in the form of a bolt which arranged to be parallel with the fork tube. The latch element of this design can thus be given relatively large dimensions so that the diameter of the support tube itself need not be chosen with such a large size.

It may be of particular advantage when the latch element is connected to a slide which extends into the support tube so as to be able to design the lock of the front wheel in a particularly simple manner. Furthermore, the locking element may preferably be connected to the slide. Moreover, the locking element serves to reliably maintain the locked state and to prevent any unintended unlocking. The locking element also preferably engages into a recess of a bearing which supports the fork



tube in the support tube. As a result, it is not necessary to mount additional parts or to take installation measures on the support tube itself.

It may also be of particular advantage for the limitation of the steering angle to be accomplished by a lower bearing which supports the fork tube in the support tube. This lower bearing may have formed thereon an attachment which projects in the direction of the linkage element and which can be brought into contact with the stop surfaces formed on the linkage element and thus on the mudguard. This design has the advantageous effect that the predetermined angular range can be limited at both sides as well, e.g. approximately 45° each side.

The invention provides of a vehicle steering head including a support tube which rotatably supports therein a fork tube to which a wheel fork and a handlebar can be secured, the steering head including a latch element projecting from the fork tube and disposed within the support tube, and a linkage element disposed within the support tube, wherein the linkage element is moveable in a direction which is substantially parallel to an axis of the fork tube and comprises at least one stop surface for limiting a rotation of the fork tube when the latch element contacts the at least one stop surface. The linkage element may further comprise at least one locking element for locking the fork tube in a single position. The at least one locking element may releasably engage the latch element when the fork tube is locked. The latch element may comprises a pin. The pin may project substantially perpendicular to the axis of the fork tube. The linkage element may comprise a substantially cylindrical shape. The linkage element may comprise a plurality of hollow chambers separated by connecting walls. The support tube may comprise an opening which allows a connecting element to pass therethrough. The opening may comprise a longitudinal slot. The connecting element may be secured to the linkage element. The movement of the linkage element may be limited by the movement of the

connecting element within the longitudinal slot. The steering head may further comprise a slide which is secured the connecting element, the slide being disposed adjacent an outer surface of the support tube. The at least one stop surface may be disposed on at least one stop.

5 The at least one stop may comprise a projection which extends from the linkage element. The at least one stop may comprise wedge-shaped hollow projection having two angled lateral stop surfaces. The at least one stop may comprise two stops which are disposed opposite one another. Each stop may comprise wedge-shaped hollow projection having two angled lateral stop surfaces. The two stops may define a limited range of rotational motion of the fork tube in each of a clockwise and a counter-clockwise direction. The limited range of motion in the clockwise direction may be substantially equal to the range of motion in the counter-clockwise direction. The limited range of motion in one of the clockwise and counter-clockwise direction may be approximately 45 degrees.

The linkage element may further comprise at least one locking element, the at least one locking element comprising at least one recess which is adapted to receive the latch element. The at least one recess is set back some distance from a surface of at least one stop. The at least one recess is centrally disposed between at least two stops.

20 The steering head may further comprise an upper bearing disposed on one end of the support tube and a lower bearing disposed on another end of the support tube, each of the upper and lower bearings having an opening which allows the fork tube to pass therethrough.

The steering head may be disposed on a tricycle frame.

25

5 The invention also provides for a vehicle steering head including a support tube which rotatably supports therein a fork tube to which a wheel fork and a handlebar can be secured, the steering head including a latch element disposed within the support tube, the latch element being moveable in a direction which is substantially parallel to an axis of the fork tube, and a linkage element connected to the fork tube so as to rotate therewith, the linkage element comprising at least one stop surface, wherein the at least one stop surface limits the rotation of the fork tube with respect to the support tube. The steering head may further comprise a slide, wherein the slide is disposed within the support tube and retains the latch element. The slide may further comprise at least one locking element for releasably securing the slide to the support tube. The linkage element may comprise a mudguard. The mudguard may be disposed between one end of the support tube and a wheel fork. The latch element may comprise a rod like member which is arranged substantially parallel to the axis of the fork tube. The rod like member may comprise one of a bolt and a pin. The latch element may be connected to a slide, the slide being disposed within the support tube. The slide may be moveable substantially parallel to the axis of the fork tube. A locking element may be connected to the slide.

20 The steering head may further comprise a bearing support disposed on at least one end of the support tube. The bearing support may be disposed on a lower end of the support tube. The steering head may further comprise a locking element disposed within the support tube, the locking element being insertable into a recess of the bearing support. The bearing support may comprise at least one stop, the at least one stop comprising at least one surface which engages the linkage element. The at least one stop may comprise a projection which engages a recess in the linkage element. 25 The projection and the recess may cooperate to limit the rotational movement of the fork tube within a desired range. The range of the rotational movement may be

limited by at least two stop surfaces. The at least two stop surfaces may define a limited range of rotation in one of a clockwise and a counter-clockwise direction. The at least two stop surfaces may define a limited range of rotation in each of a clockwise and a counter-clockwise direction. The limited range of rotation between the at least two stops may be approximately 45 degrees.

The steering head may be disposed on a tricycle frame.

The invention further provides for a vehicle steering head including a support tube and fork tube which is rotatably mounted with respect to the support tube, the steering head including an upper bearing support disposed at an upper end of the support tube, a lower bearing support disposed at a lower end of the support tube, the fork tube comprising a fork end, a handlebar, and a latch element projecting from the fork tube between the fork end and the handlebar end, the latch element being disposed within the support tube, a linkage element slidable disposed within the support tube, the linkage element comprising at least one stop surface for engaging the latch element, wherein the linkage element is moveable in a direction which is substantially parallel to an axis of the fork tube from a first position where the latch element and the at least one stop cooperate to limit the rotational movement of the fork tube to a second position where the latch element releasably engages a locking element disposed on the linkage element whereby the fork tube is prevented from rotating in any direction. The linkage element may be moveable from outside the support tube via a slide. The slide may be connected to the linkage element via a connection element, the connection element passing through a longitudinal in the support tube. The longitudinal slot may limit the movement of the linkage element.

The invention also relates to a vehicle steering head including a support tube and fork tube which is rotatably mounted with respect to the support tube, the steering head including an upper bearing support disposed at an upper end of the support tube,

5 a lower bearing support disposed at a lower end of the support tube, the lower bearing support comprising at least one stop surface, the fork tube comprising a fork end, a handlebar, and a latch element which is slidably disposed adjacent the fork tube between the fork end and the handlebar end, the latch element being disposed within the support tube, a linkage element moveably disposed adjacent the lower support bearing, the linkage element comprising at least one stop surface for engaging the at least one stop surface of the lower bearing support and comprising a recess for receiving the latch element, wherein the linkage element is moveable in a direction which is substantially parallel to an axis of the fork tube from a first position where the latch element engages only the lower bearing support and where the at least one stop of the lower bearing support cooperates with the at least one stop of the linkage element to limit the rotational movement of the fork tube to a second position where the latch element releasably engages a recess in the linkage element whereby the fork tube is prevented from rotating in any direction. The linkage element may be moveable from outside the support tube via a slide. The slide may be connected to the linkage element via a connection element, the connection element passing through a longitudinal in the support tube. The longitudinal slot may limit the movement of the linkage element. The linkage element may further comprise at least one locking element for engaging a locking recess in the lower bearing support. The at least one locking element engages the locking recess of the lower bearing support when the latch element engages the recess in the linkage element.

20

25 The invention provides for a vehicle steering head including a fork tube adapted to engage a handlebar, a support tube which rotatably supports the fork tube, a latch element disposed within the support tube, and a slide which is moveable with respect to the support tube, wherein the slide is moveable from at least one position wherein linkage element prevents the fork tube from rotating with respect to the

support tube to at least another position wherein the linkage element allows the fork tube to rotate with respect to the support tube in at least two directions. The latch element may comprise a rod-like member.

5

### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is further described in the detailed description which follows, in reference to the noted plurality of drawings by way of non-limiting examples of exemplary embodiments of the present invention, in which like reference numerals represent similar parts throughout the several views of the drawings, and wherein:

Fig. 1 is a schematic side view of a children's tricycle with one embodiment of the vehicle steering head according to the invention;

Fig. 2 is a simplified sectional side view of the steering head according to the invention in an unlocked state;

Fig. 3 is a side view, turned or oriented by 90° (a right angle) of the arrangement shown in Fig. 2;

Fig. 4 is a sectional side view similar to Fig. 2, in the locked state;

Fig. 5 is a side view, similar to Fig. 3, of the view according to Fig. 4;

Fig. 6 is a simplified perspective illustration of the linkage element according to the invention;

Fig. 7 is a schematic side view of a children's tricycle with another embodiment of the vehicle steering head according to the invention;

Fig. 8 is a sectional side view of the vehicle steering head according to the invention, in the unlocked state;

Fig. 9 is a side view, turned or oriented by 90° of the arrangement shown in Fig. 8;

Fig. 10 is a sectional side view similar to Fig. 8, in the locked state;

Fig. 11 is a side view, turned or oriented by 90° which is similar to Fig. 9, in the locked state;

Fig. 12 is a top view on the linkage element according to the invention and on the associated mudguard;

Fig. 13 is a sectional view of the arrangement according to Fig. 12 along the sectional lines XIII-XIII of Fig. 12;

Fig. 14 is an enlarged side view showing a portion of the slide and of the locking element in the locked state;

Fig. 15 is a view analogous to Fig. 14, in the unlocked state;

Fig. 16 is a top view on the slide; and

Fig. 17 is a top view on the lower bearing.

#### DETAILED DESCRIPTION OF THE INVENTION

The particulars shown herein are by way of example and for purposes of illustrative discussion of the embodiments of the present invention only and are presented in the cause of providing what is believed to be the most useful and readily understood description of the principles and conceptual aspects of the present invention. In this regard, no attempt is made to show structural details of the present invention in more detail than is necessary for the fundamental understanding of the present invention, the description taken with the drawings making apparent to those skilled in the art how the several forms of the present invention may be embodied in practice.

A children's tricycle is shown in Fig. 1 and comprises a front wheel 14 which is supported on a wheel fork 4. Wheel fork 4 is fixedly connected to a fork tube 3. A handlebar (not shown) can be secured to the upper end of fork tube 3.

Fork tube 3 is supported in a support tube 2. This support is accomplished by utilizing slide bearings 15 and 15' which are shown in detail in Figs. 2 to 5. The slide bearings 15 and 15' correspond to those of the prior art in this embodiment so that a detailed description is here not needed.

Support tube 2 is firmly connected to a frame 16 which has mounted thereon a seat 17. The tricycle also has a rear axle 18 with rear wheels 19. Accordingly, it is support tube 2 and fork tube 3 which form a steering head 1.

According to the invention, support tube 2 has arranged therein a linkage element 6 which has a substantially cylindrical configuration (see also figure 6) and which is received with a play or clearance (so that it can slide) within support tube 2. Linkage element 6 is also provided with a central recess through which fork tube 3 extends or passes.

Support tube 2 also has formed therein a longitudinal slot 9 through which a connection element 10 extends or passes. This connection element 10 is connected to a slide 11 and linkage element 6. The connection may be via a screw 20 (see Figs. 2 and 4) or other conventional connecting mechanism. In the illustrated embodiment, connection element 10 is integrally connected to or formed with slide 11 and extends in a recess 21 of linkage element 6. However, connection element 10 and slide may be made as separate components which are joined or secured together by any conventional attachment technique including a screw or threaded element.

On its front upper portion, linkage element 6 comprises two symmetrical opposite attachments or stops 12. Each of these stops 12 may be provided with lateral stop surfaces 7. When viewed from the top, these attachments or stops 12 are designed in a manner of a segment of a partial circle (pie shaped or wedge shaped), so that four stop surfaces 7 are formed with each one being arranged in symmetry



with one another. Of course, stops 12 may be separately formed and attached to linkage element 6 instead of being integrally formed therewith as is shown.

In the illustrated embodiment two locking elements 8 may be utilized in which each is formed by a recess 13. These locking elements 8 are preferably provided on linkage element 6 in retracted or set back manner with respect to stops 12. As becomes apparent from Fig. 6, the walls of at least one recess 13 may be made resilient to ensure a releasable locking of a bolt-like latch element 5 when linkage element 6 is pushed upwards or into engagement with bolt-like latch element 5.

As becomes apparent from Figs. 2 to 5, fork tube 3 is provided with a bolt-like or pin-like latch element 5 which extends or projects from at least one and preferably both sides of fork tube 3. Of course, latch element 5 may be integrally formed with fork tube. Alternatively, latch element 5 may be a threaded or partially threaded member which threads into fork tube 3. However, it is preferred that latch element 5 is a pin having a centrally disposed exterior knurl which is press fit into fork tube as is shown. In its working position, latch element 5 rotates with fork tube 3 when a deflection or rotation of the handlebar takes place. The deflection of the handlebar is limited by way of latch element 5 abutting on stop surfaces 7, these stop surfaces 7 defining the limited range of motion of the handlebar.

When it is desired to lock the handlebar in a set position, latch element 5 is pressed or forced into recesses 13. This engagement occurs when locking element 8, which is disposed on linkage element 6, is pushed upwards by slide 11. Recesses 8 also utilize inclined inlet surfaces because they act as guiding lead-in surfaces which facilitate entry of pin 5 into recess 8. In the locked state, which is shown in Figs. 4 and 5, a steering movement thus becomes impossible since the handlebar or fork tube 3 is locked in a single direction. Figs 2 and 3 show a downwardly displaced condition of linkage element 6 in which latch element 5 is in a position which it does not

cooperate with the locking element 8. As a result, in this position fork tube 3 and handlebar are free to rotate until latch element 5 abuts on stop surfaces 7, this range of movement or rotation corresponding to a steering angle range.

According to a preferred aspect of the invention, linkage element 6 may be made from a plastic material. Of course, other materials are also contemplated.

Another embodiment of the vehicle steering head according to the invention is described with reference to Figs. 7 to 16. In this regard, like parts are provided with like reference numerals.

As for the description of Fig. 7, reference can be made to the description of Fig. 1 to the extent that the same features are shown. The subsequent figures are illustrations elucidating the details which have been changed.

As in Figs. 2 to 5, Figs. 8 and 9 and 10 and 11, respectively, are illustrations showing the vehicle steering head on an enlarged scale. Again, like parts are here also provided with like reference numerals, so that reference can be made to the preceding explanations. Slide 11 utilizes connection element 10 and screw 20. Connection element 10 also extends through a longitudinal slot 9. Moreover, slide 11 comprises an outer grip portion 11 and an interior portion 11' which is screwed to outer grip portion 11 by a screw 20. A top view of slide 11 and 11' is shown in Fig. 16. As can be seen in this figure, a central recess 24 is provided through which fork tube 3 extends or passes (with a clearance which allows slide 11' to move up and down with respect to fork tube 3). Furthermore, slide 11' also has a recess (see figs. 9, 11 and 16) which is formed so that it can accept a bolt-like latch element 5'. Of course, this latch element 5' may be pressed into this recess, threaded into the recess, or otherwise secured to slide 11' in a suitable manner. Alternatively, latch element 5' may be integrally formed with slide 11'.

As already described in conjunction with a previous embodiment, a bearing 15 which serves as a slide bearing is used on the upper portion of steering head 1.

Lower bearing 15' in this embodiment is configured such that it has an upwardly projecting contour of a linkage element 6' which can extend into bearing 15'. Of course, the bearing and the upwardly projecting contour may be made as separate components which are joined together by conventional techniques rather than integrally formed as is shown. Additionally, as becomes apparent in Fig. 12, linkage element 6' may have a recess 25 into which latch element 5' can be inserted (see also Figs. 9 and 11).

As can further be seen from the top view of Fig. 12, linkage element 6' comprises two lateral stop surfaces 7 which are angularly spaced apart from each other. This design is such that a downwardly oriented attachment or stop 26 (see Figs. 8 to 11) of the bearing 15', which is connected to support tube 2 for rotation therewith, forms a steering limitation of plus/minus approximately 45°. Of course, as with the previous embodiment, the range of steering limitation can be designed to any desired range.

Fig. 13 shows a lateral sectional view of mudguard 22 and of linkage element 6'. Note that these components are integrally formed as a single member which reduces manufacturing costs associated with joining two separate components.

Figs. 14 and 15 are front views of slide 11' wherein handpiece 11 has been removed to illustrate the operation of locking element 8'. Locking element 8' comprises a U-shaped and includes two movable or flexible lateral legs which can releasably be inserted into a recess 23 of bearing 15'. Upon insertion and locking, locking element 8' is pressed against an undercut and thereby held in position inside recess 23. Accordingly, when it is desired to release the locked state of fork tube 3, slide 11' must be pushed upwards which removes the legs from recess 23. Of course,

other locking mechanisms may be utilized and this embodiment is not limited to the use of this particular locking mechanism. For example, a pin may be used which has a floating ring disposed around its circumference. Alternatively, other conventional releasable locking mechanisms may be utilized.

5 Fig. 17 is a top view on lower bearing 15' on an enlarged scale. The (downwardly projecting) attachment or stop 26 can here be seen as well as recess 23 which receives locking element 8'. Moreover, recess 27 is adapted to receive and guide bolt-like latch element 5' therein. Furthermore, a surrounding collar-like edge 28 can be seen in which 29 designates two oppositely disposed attachments or projections which serve as anti-rotation engagements. These engagements are designed to engage recesses (not shown) of support tube 2. Of course, lower bearing may be secured to support tube 2 in any conventional manner such as by bonding, welding, or screws. Moreover, this attachment may be releasable or more permanent in nature.

10 It is noted that the foregoing examples have been provided merely for the purpose of explanation and are in no way to be construed as limiting of the present invention. While the present invention has been described with reference to an exemplary embodiment, it is understood that the words which have been used herein are words of description and illustration, rather than words of limitation. Changes may be made, within the purview of the appended claims, as presently stated and as amended, without departing from the scope and spirit of the present invention in its aspects. Although the present invention has been described herein with reference to particular means, materials and embodiments, the present invention is not intended to be limited to the particulars disclosed herein; rather, the present invention extends to all functionally equivalent structures, methods and uses, such as are within the scope of the appended claims.

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WHAT IS CLAIMED:

1. A vehicle steering head including a support tube which rotatably supports therein a fork tube to which a wheel fork and a handlebar can be secured, the steering head comprising:

a latch element projecting from the fork tube and disposed within the support tube; and

a linkage element disposed within the support tube,

wherein the linkage element is moveable in a direction which is substantially parallel to an axis of the fork tube and comprises at least one stop surface for limiting a rotation of the fork tube when the latch element contacts the at least one stop surface.

2. The steering head of claim 1, wherein the linkage element further comprises at least one locking element for locking the fork tube in a single position.

3. The steering head of claim 2, wherein the at least one locking element releasably engages the latch element when the fork tube is locked.

4. The steering head of claim 1, wherein the latch element comprises a pin.

5. The steering head of claim 4, wherein the pin projects substantially perpendicular to the axis of the fork tube.

6. The steering head of claim 1, wherein the linkage element comprises a substantially cylindrical shape.

7. The steering head of claim 6, wherein the linkage element comprises a plurality of hollow chambers separated by connecting walls.

8. The steering head of claim 1, wherein the support tube comprises an opening which allows a connecting element to pass therethrough.

9. The steering head of claim 8, wherein the opening comprises a longitudinal slot.

10. The steering head of claim 9, wherein the connecting element is secured to the linkage element.

11. The steering head of claim 10, wherein the movement of the linkage element is limited by the movement of the connecting element within the longitudinal slot.

12. The steering head of claim 10, further comprising a slide which is secured the connecting element, the slide being disposed adjacent an outer surface of the support tube.

13. The steering head of claim 1, wherein the at least one stop surface is disposed on at least one stop.

14. The steering head of claim 13, wherein the at least one stop comprises a projection which extends from the linkage element.

15. The steering head of claim 14, wherein the at least one stop comprises wedge-shaped hollow projection having two angled lateral stop surfaces.

16. The steering head of claim 13, wherein the at least one stop comprises two stops which are disposed opposite one another.

17. The steering head of claim 16, wherein each stop comprises wedge-shaped hollow projection having two angled lateral stop surfaces.

18. The steering head of claim 16, wherein the two stops define a limited range of rotational motion of the fork tube in each of a clockwise and a counter-clockwise direction.

19. The steering head of claim 18, wherein the limited range of motion in the clockwise direction is substantially equal to the range of motion in the counter-clockwise direction.

20. The steering head of claim 18, wherein the limited range of motion in one of the clockwise and counter-clockwise direction is approximately 45 degrees.

21. The steering head of claim 1, wherein the linkage element further comprises at least one locking element, the at least one locking element comprising at least one recess which is adapted to receive the latch element.

22. The steering head of claim 21, wherein the at least one recess is set back some distance from a surface of at least one stop.

23. The steering head of claim 21, wherein the at least one recess is centrally disposed between at least two stops.

24. The steering head of claim 1, further comprising an upper bearing disposed on one end of the support tube and a lower bearing disposed on another end of the support tube, each of the upper and lower bearings having an opening which allows the fork tube to pass therethrough.

25. The steering head of claim 1, wherein the steering head is disposed on a tricycle frame.

26. A vehicle steering head including a support tube which rotatably supports therein a fork tube to which a wheel fork and a handlebar can be secured, the steering head comprising:

a latch element disposed within the support tube, the latch element being moveable in a direction which is substantially parallel to an axis of the fork tube; and

a linkage element connected to the fork tube so as to rotate therewith, the linkage element comprising at least one stop surface;

wherein the at least one stop surface limits the rotation of the fork tube with respect to the support tube.

27. The steering head of claim 26, further comprising a slide, wherein the slide is disposed within the support tube and retains the latch element.

28. The steering head of claim 27, wherein the slide further comprises at least one locking element for releasably securing the slide to the support tube.



29. The steering head of claim 26, wherein the linkage element comprises a mudguard.

30. The steering head of claim 29, wherein the mudguard is disposed between one end of the support tube and a wheel fork.

31. The steering head of claim 26, wherein the latch element comprises a rod like member which is arranged substantially parallel to the axis of the fork tube.

32. The steering head of claim 31, wherein the rod like member comprises one of a bolt and a pin.

33. The steering head of claim 26, wherein the latch element is connected to a slide, the slide being disposed within the support tube.

34. The steering head of claim 33, wherein the slide is moveable substantially parallel to the axis of the fork tube.

35. The steering head of claim 33, wherein a locking element is connected to the slide.

36. The steering head of claim 26, further comprising a bearing support disposed on at least one end of the support tube.

37. The steering head of claim 36, wherein the bearing support is disposed on a lower end of the support tube.

38. The steering head of claim 36, further comprising a locking element disposed within the support tube, the locking element being insertable into a recess of the bearing support.

5 39. The steering head of claim 36, wherein the bearing support comprises at least one stop, the at least one stop comprising at least one surface which engages the linkage element.

40. The steering head of claim 38, wherein the at least one stop comprises a projection which engages a recess in the linkage element.

41. The steering head of claim 39, wherein the projection and the recess cooperate to limit the rotational movement of the fork tube within a desired range.

42. The steering head of claim 40, wherein the range of the rotational movement is limited by at least two stop surfaces.

43. The steering head of claim 41, wherein the at least two stop surfaces define a limited range of rotation in one of a clockwise and a counter-clockwise direction.

44. The steering head of claim 42, wherein the at least two stop surfaces define a limited range of rotation in each of a clockwise and a counter-clockwise direction.

45. The steering head of claim 42, wherein the limited range of rotation between the at least two stops is approximately 45 degrees.

46. The steering head of claim 26, wherein the steering head is disposed on a tricycle frame.

47. A vehicle steering head including a support tube and fork tube which is rotatably mounted with respect to the support tube, the steering head comprising:

an upper bearing support disposed at an upper end of the support tube;

a lower bearing support disposed at a lower end of the support tube;

the fork tube comprising a fork end, a handlebar, and a latch element projecting from the fork tube between the fork end and the handlebar end, the latch element being disposed within the support tube;

a linkage element slidable disposed within the support tube, the linkage element comprising at least one stop surface for engaging the latch element;

wherein the linkage element is moveable in a direction which is substantially parallel to an axis of the fork tube from a first position where the latch element and the at least one stop cooperate to limit the rotational movement of the fork tube to a second position where the latch element releasably engages a locking element disposed on the linkage element whereby the fork tube is prevented from rotating in any direction.

48. The steering head of claim 47, wherein the linkage element is moveable from outside the support tube via a slide.

49. The steering head of claim 48, wherein the slide is connected to the linkage element via a connection element, the connection element passing through a longitudinal in the support tube.

50. The steering head of claim 49, wherein the longitudinal slot limits the movement of the linkage element.

51. A vehicle steering head including a support tube and fork tube which is rotatably mounted with respect to the support tube, the steering head comprising:

an upper bearing support disposed at an upper end of the support tube;

a lower bearing support disposed at a lower end of the support tube, the lower bearing support comprising at least one stop surface;

the fork tube comprising a fork end, a handlebar, and a latch element which is slidably disposed adjacent the fork tube between the fork end and the handlebar end, the latch element being disposed within the support tube;

a linkage element moveably disposed adjacent the lower support bearing, the linkage element comprising at least one stop surface for engaging the at least one stop surface of the lower bearing support and comprising a recess for receiving the latch element;

wherein the linkage element is moveable in a direction which is substantially parallel to an axis of the fork tube from a first position where the latch element engages only the lower bearing support and where the at least one stop of the lower bearing support cooperates with the at least one stop of the linkage element to limit the rotational movement of the fork tube to a second position where the latch element releasably engages a recess in the linkage element whereby the fork tube is prevented from rotating in any direction.

52. The steering head of claim 51, wherein the linkage element is moveable from outside the support tube via a slide.

53. The steering head of claim 52, wherein the slide is connected to the linkage element via a connection element, the connection element passing through a longitudinal in the support tube.

5 54. The steering head of claim 53, wherein the longitudinal slot limits the movement of the linkage element.

55. The steering head of claim 51, wherein the linkage element further comprises at least one locking element for engaging a locking recess in the lower bearing support.

56. The steering head of claim 55, wherein the at least one locking element engages the locking recess of the lower bearing support when the latch element engages the recess in the linkage element.

57. A vehicle steering head comprising:

a fork tube adapted to engage a handlebar;

a support tube which rotatably supports the fork tube;

a latch element disposed within the support tube; and

20 a slide which is moveable with respect to the support tube,

wherein the slide is moveable from at least one position wherein linkage element prevents the fork tube from rotating with respect to the support tube to at least another position wherein the linkage element allows the fork tube to rotate with respect to the support tube in at least two directions.

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58. The steering head of claim 57, wherein the latch element comprises a rod-like member.

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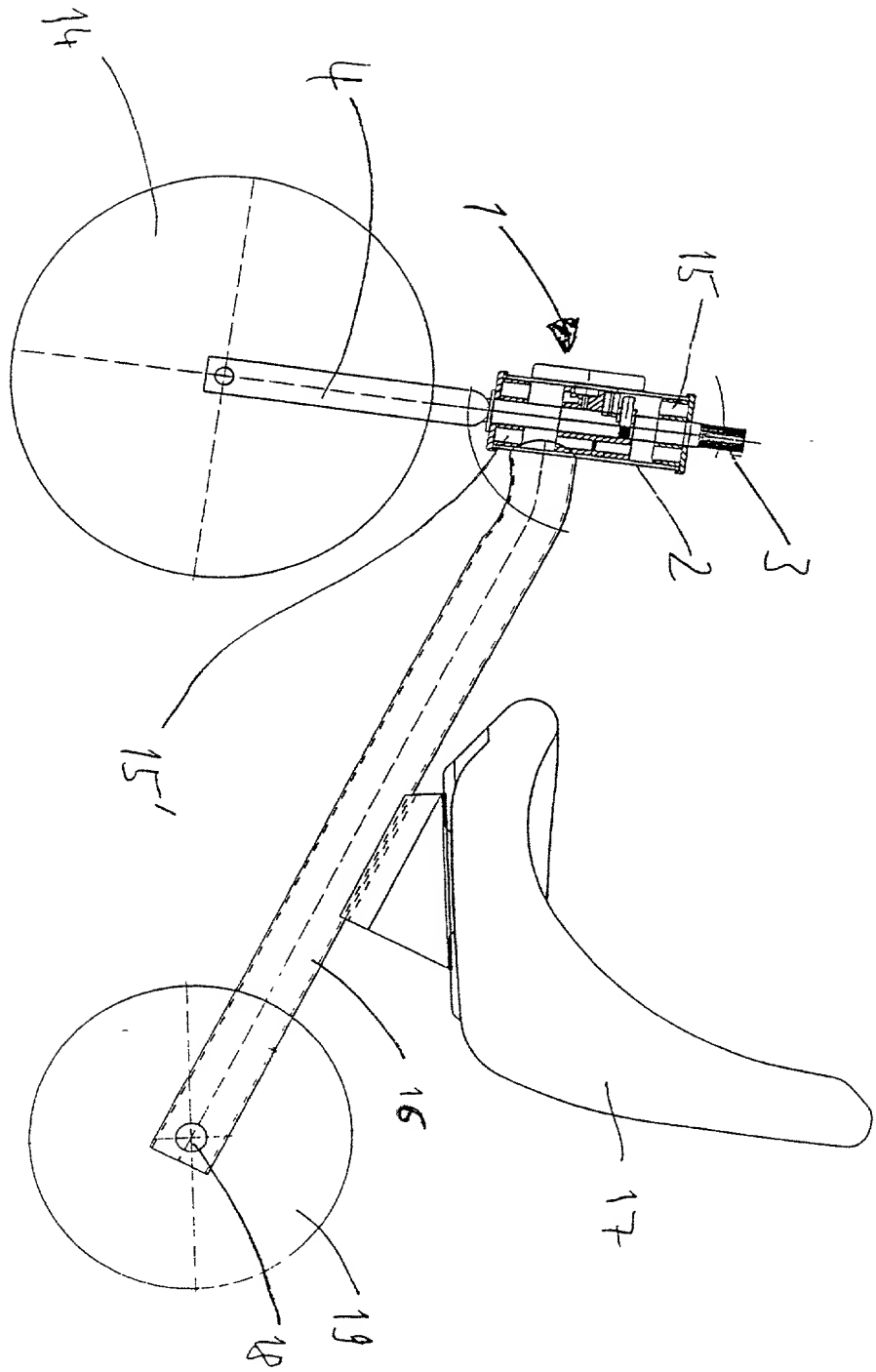
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## ABSTRACT OF THE DISCLOSURE

A vehicle steering head including a fork tube adapted to engage a handlebar, a support tube which rotatably supports the fork tube, a latch element disposed within the support tube, and a slide which is moveable with respect to the support tube, wherein the slide is moveable from at least one position wherein linkage element prevents the fork tube from rotating with respect to the support tube to at least another position wherein the linkage element allows the fork tube to rotate with respect to the support tube in at least two directions.

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Fig. 1





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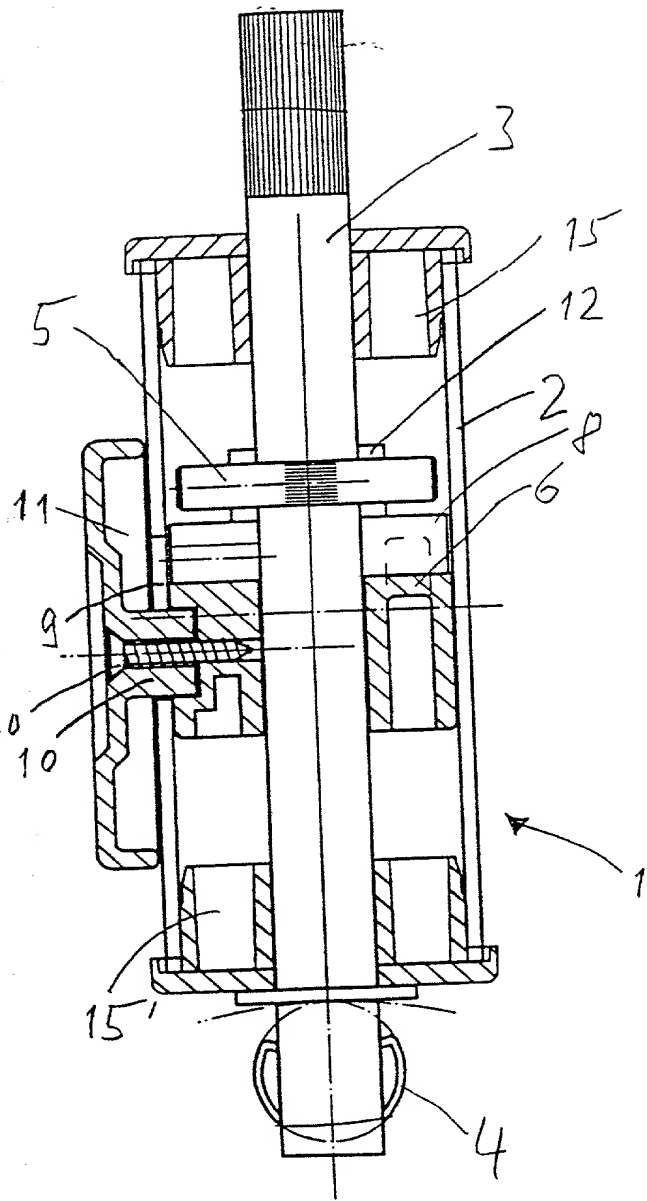


Fig. 2

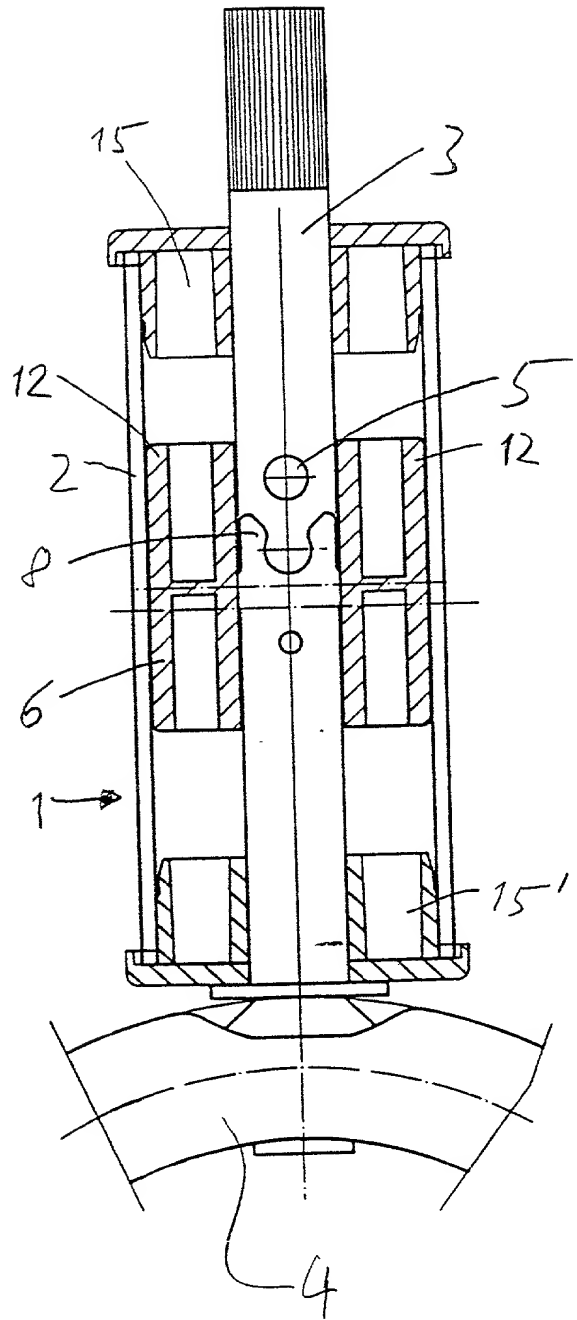


Fig. 3

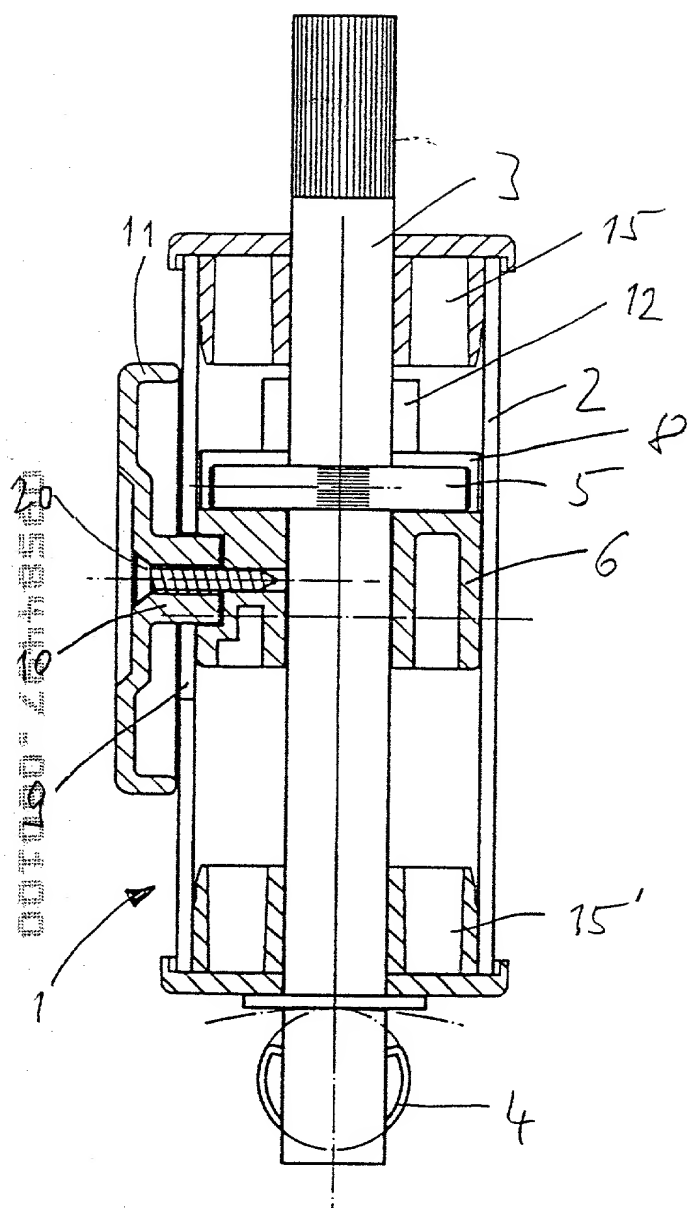


Fig. 4

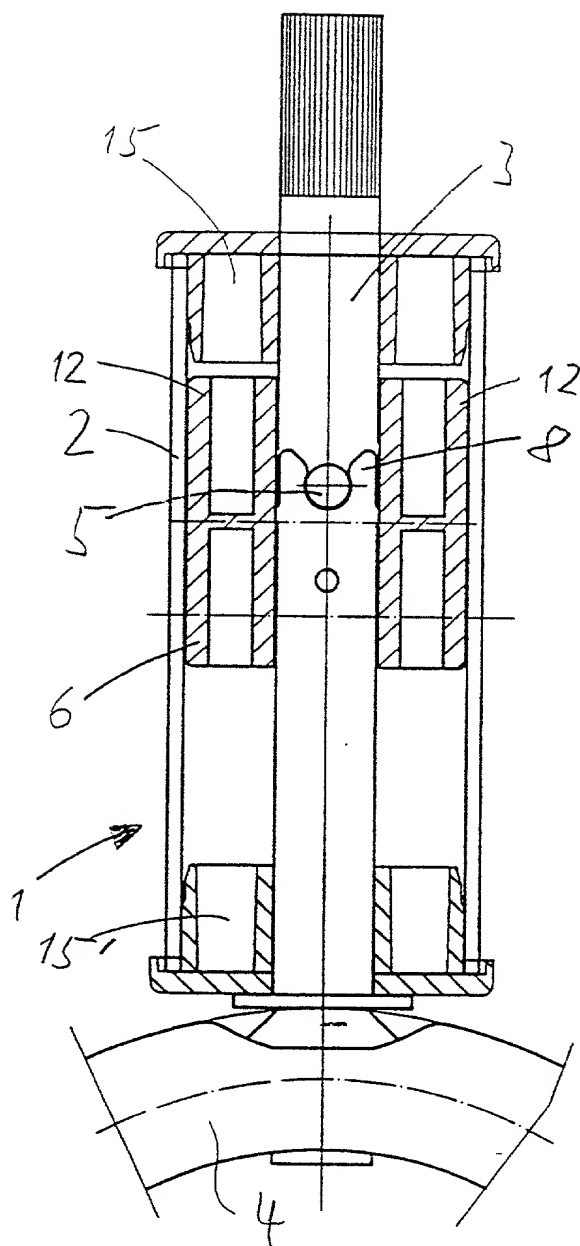


Fig. 5

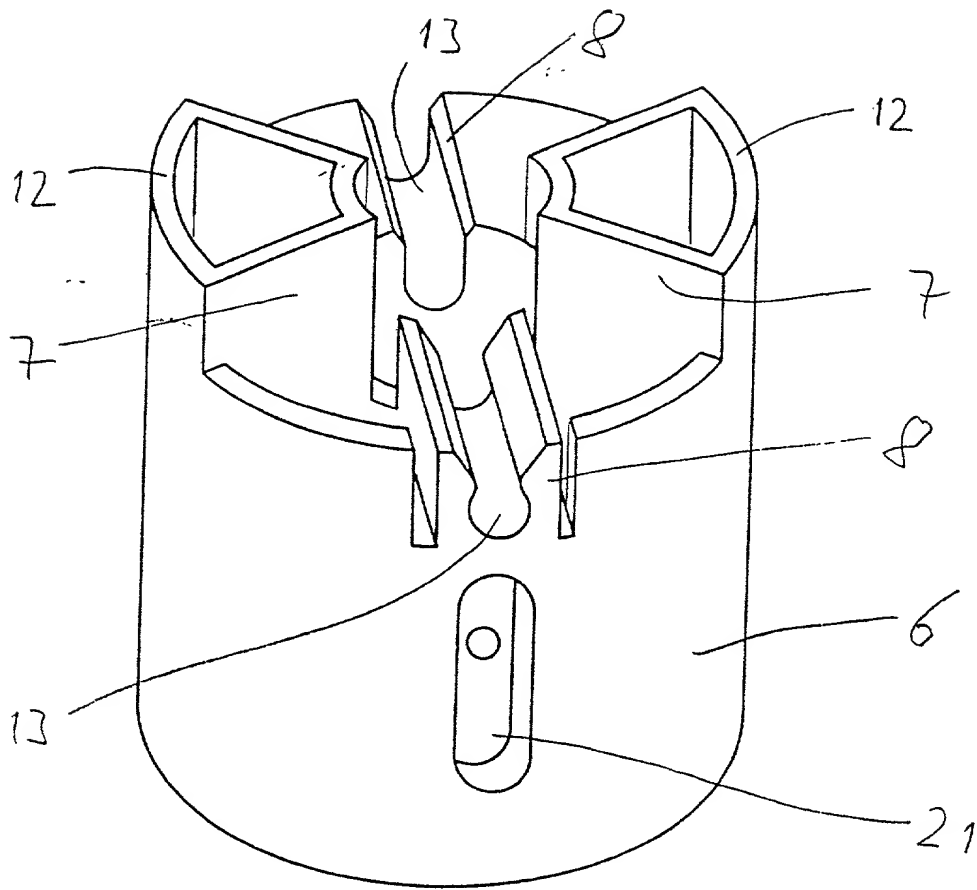


Fig. 6

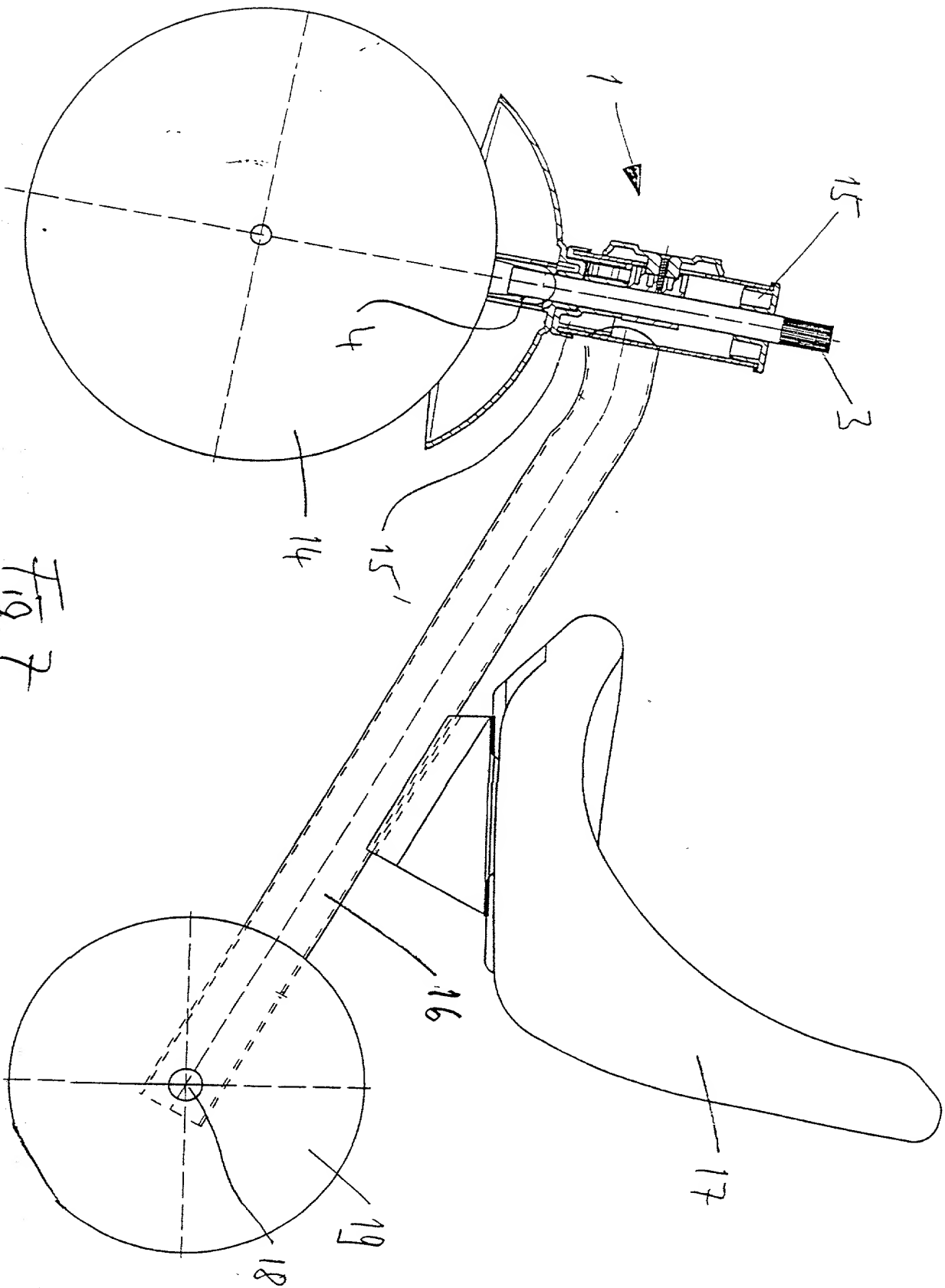
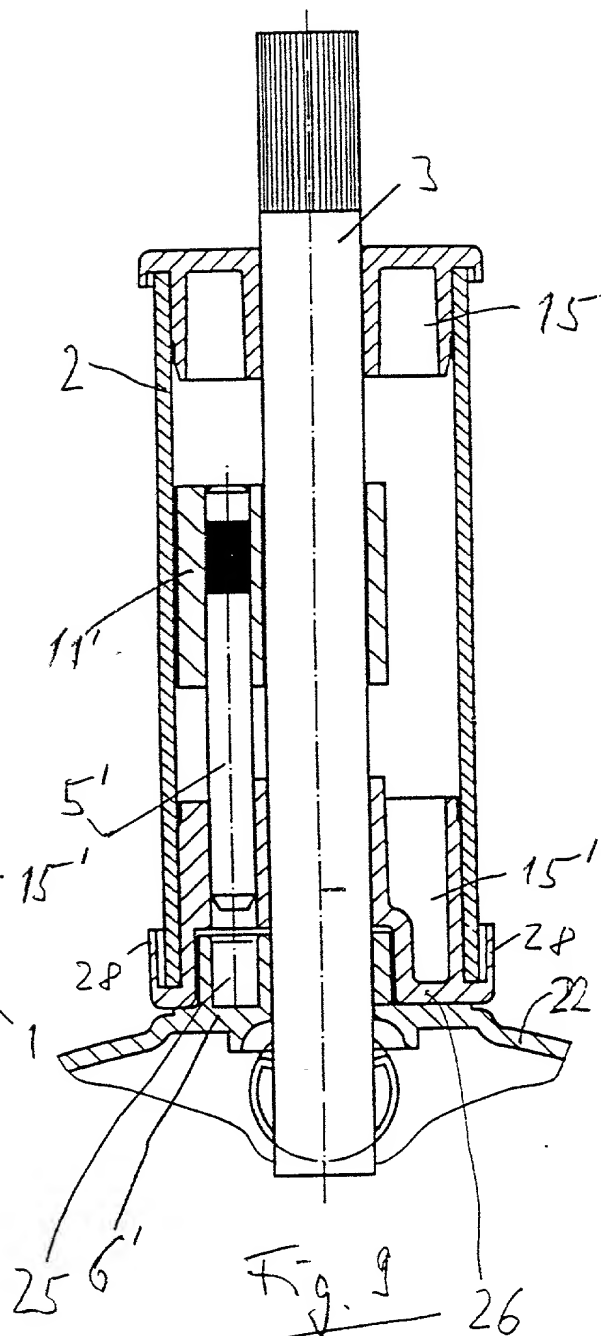
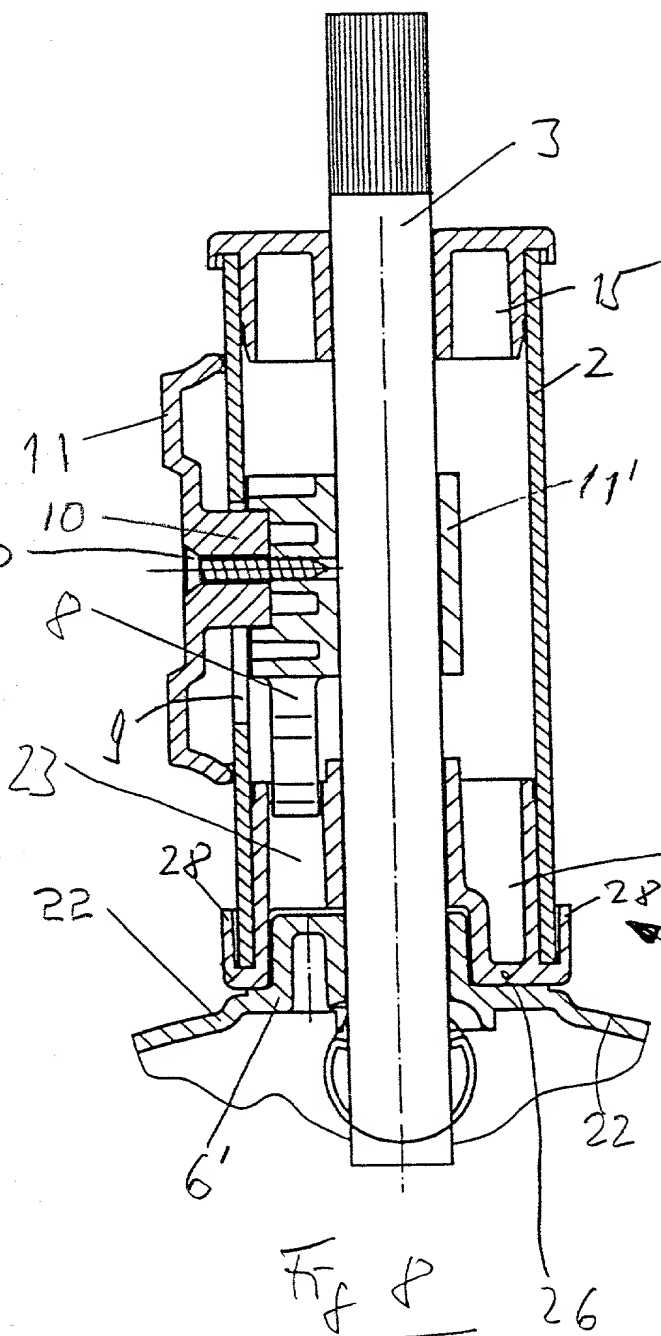
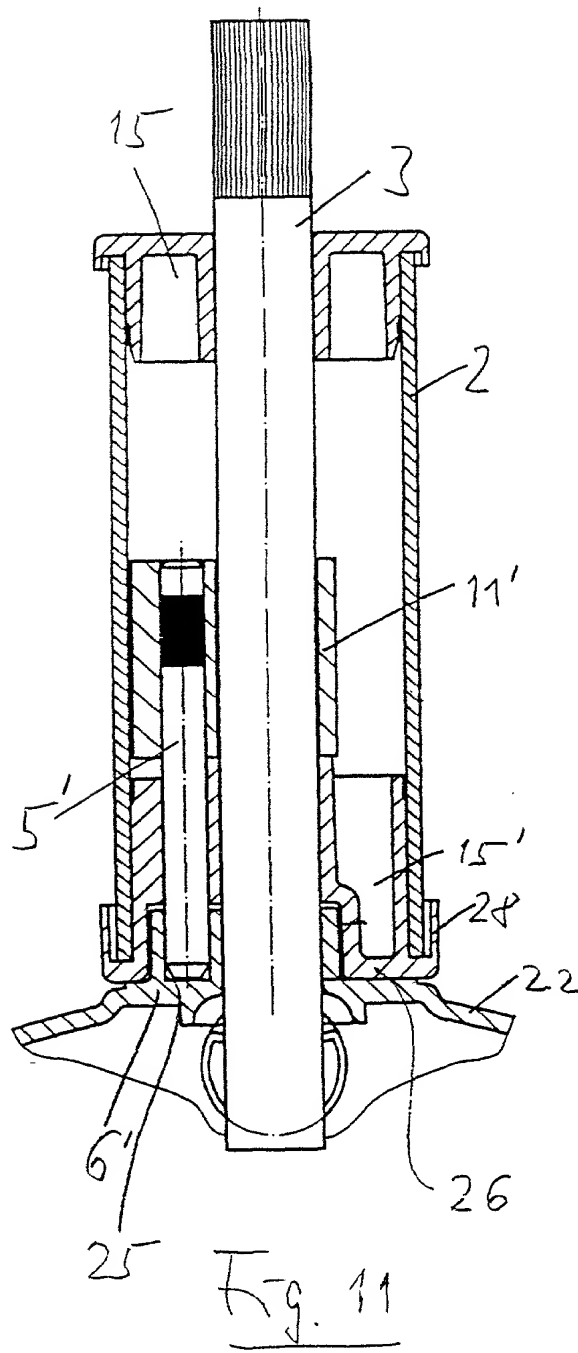
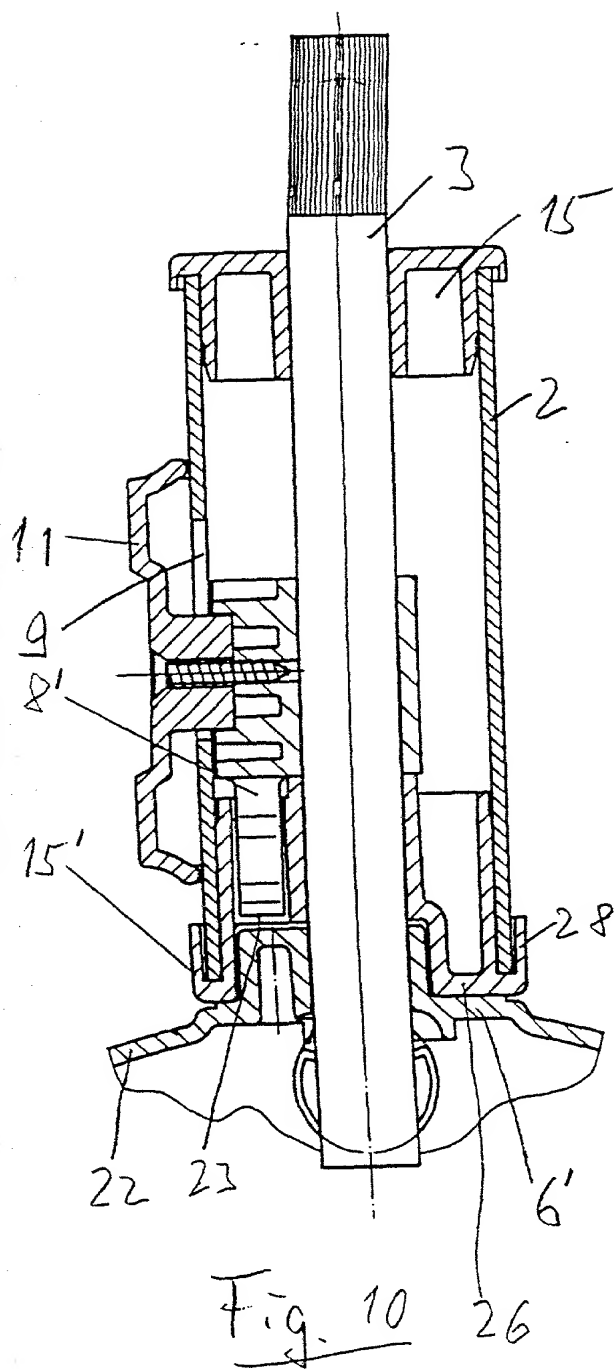


Fig. 7

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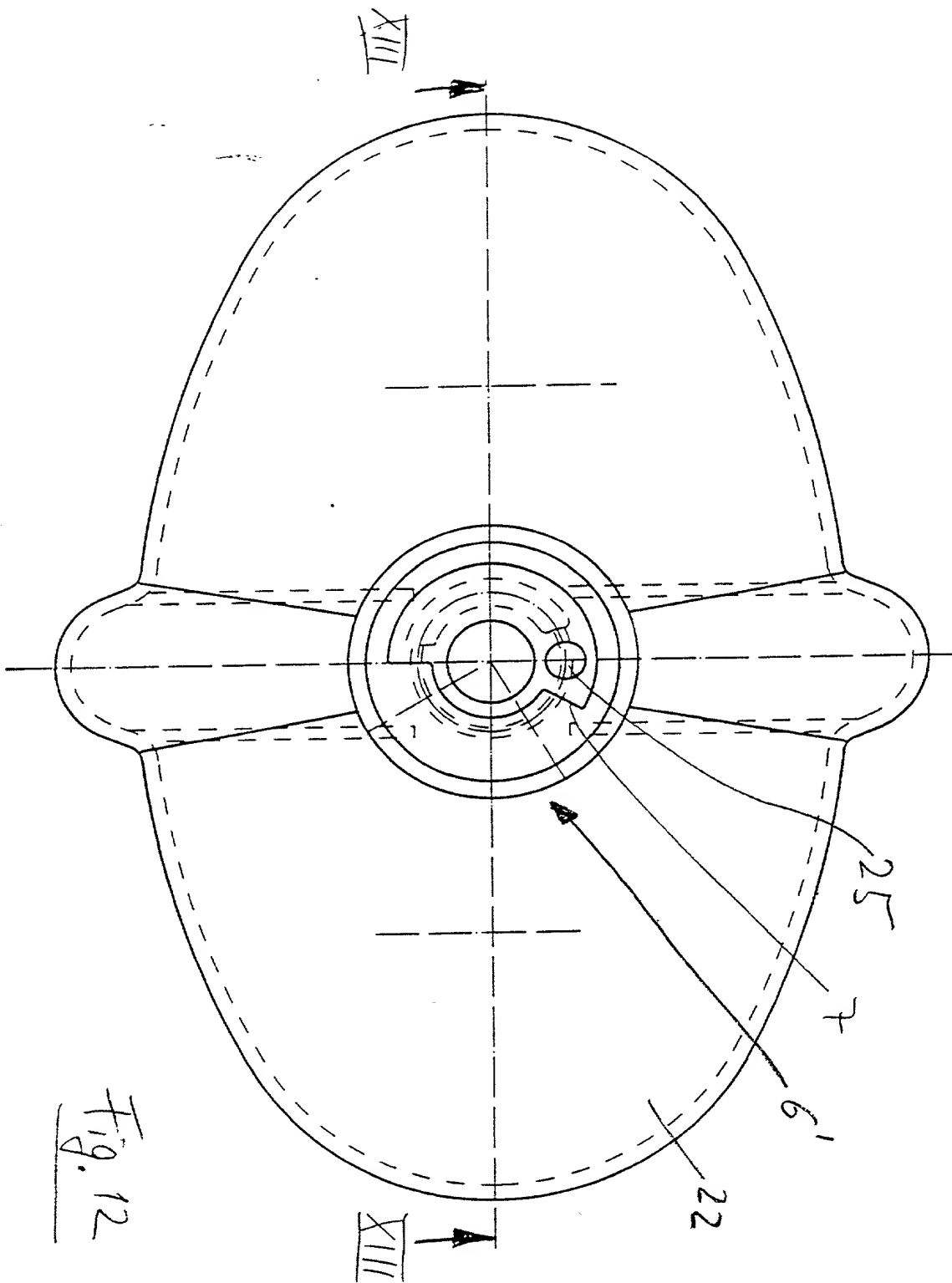


Fig. 12

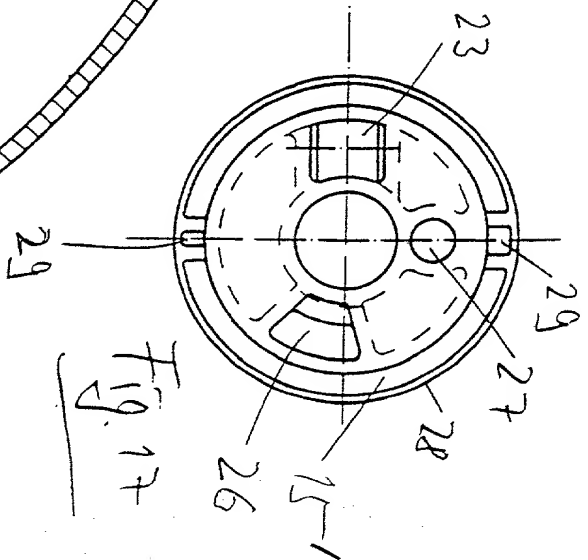
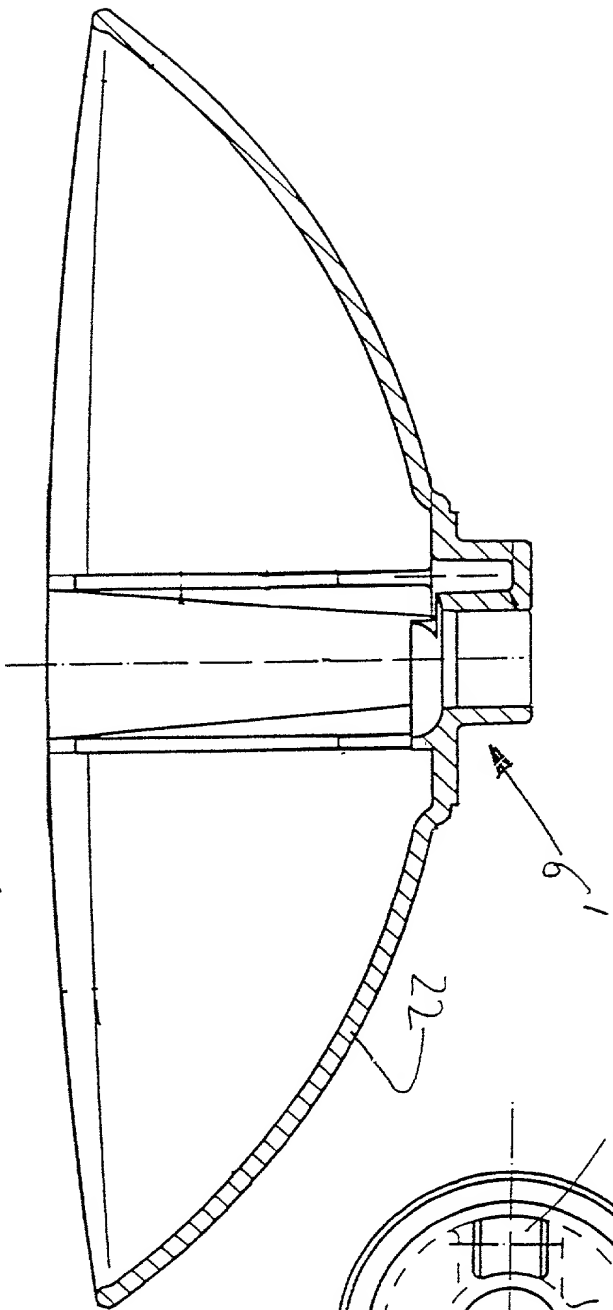


Fig. 13

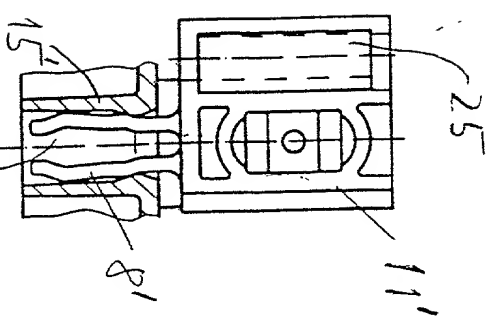


Fig. 14

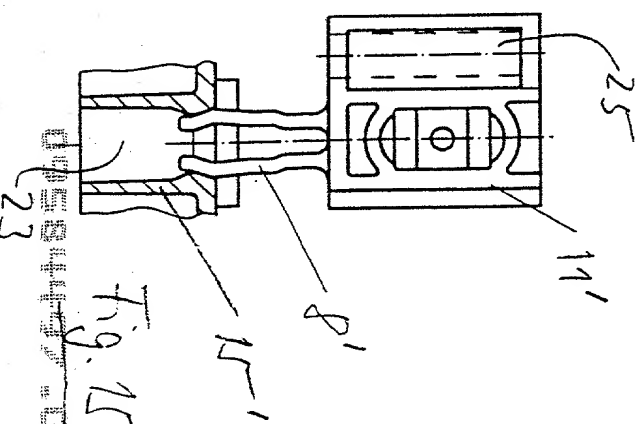


Fig. 15

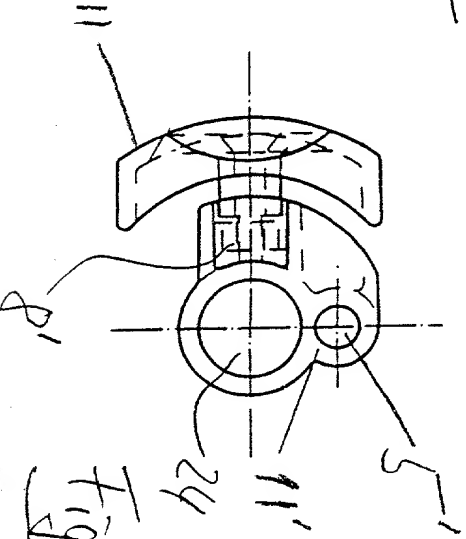


Fig. 16



**Declaration and Power of Attorney For Utility or Design Patent Application**Erklärung für Patentanmeldungen zur Gebrauchseignung und Entwicklung  
mit Vollmacht

## German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides  
Statt:

daß mein Wohnsitz, meine Postanschrift und meine Staats-  
angehörigkeit den im nachstehenden nach meinem Namen  
aufgeführten Angaben entsprechen, daß ich nach bestem Wissen der  
ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein  
Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder  
(falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes  
bin, für den dieser Antrag gestellt wird und für den ein Patent für die  
Erfindung mit folgendem Titel beantragt wird:

deren Beschreibung hier beigelegt ist, es sei denn (in diesem Falle  
Zutreffendes bitte ankreuzen), diese Erfindung

☐ wurde angemeldet am \_\_\_\_\_  
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und wurde am \_\_\_\_\_ abgeändert (falls zutreffend) oder

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Ich bestätige hiermit, daß ich den Inhalt der oben angegebene Paten-  
tanmeldung, einschließlich der Ansprüche, die eventuell durch einen  
oben erwähnten Zusatzantrag abgeändert wurde, durchgesehen und  
verstanden habe.

Ich erkenne meine Pflicht zur Offenbarung jeglicher Informationen  
an, die zur Prüfung der Patentfähigkeit in Einklang mit Titel 37, Code  
of Federal Regulations, § 1.56 von Belang sind.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäß Title  
35, US-Code, § 119 (a)-(d), bzw. § 365(b) aller unten aufgeführten  
Auslandsanmeldungen für Patente oder Erfinderurkunden, oder §  
365(a) aller PCT internationalen Anmeldungen, welche wenigstens  
ein Land ausser den Vereinigten Staaten von Amerika benennen, und  
habe nachstehend durch ankreuzen sämtliche Auslandsanmeldungen  
für Patente bzw. Erfinderurkunden oder PCT internationale  
Anmeldungen angegeben, deren Anmeldetag dem der Anmeldung,  
für welche Priorität beansprucht wird, vorangeht.

## Prior Foreign Applications

Frühere ausländische Anmeldungen

299 11 652.2 GERMANY  
(Number) (Country)  
(Number) (Land)

\_\_\_\_\_  
(Number) (Country)  
(Number) (Land)

5/JULY/1999  
(Day/Month/Year Filed)  
(Tag/Monat/Jahr der Anmeldung)

\_\_\_\_\_  
(Day/Month/Year Filed)  
(Tag/Monat/Jahr der Anmeldung)

Priority Claimed  
Prioritätsanspruch

☒ ☐  
Yes No  
Ja Nein

☐ ☐  
Yes No  
Ja Nein

☐ Zusätzliche einstweilige Anmeldungsnummern sind im  
Prioritätsanhang aufgeführt.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated  
below next to my name.

I believe I am the original, first and sole inventor (if only one name  
is listed below) or an original, first and joint inventor (if plural  
names are listed below) of the subject matter which is claimed and  
for which a patent is sought on the invention entitled

VEHICLE STEERING HEAD

the specification of which is attached hereto unless the following  
box is checked:

☐ was filed on \_\_\_\_\_ as  
United States Application Number \_\_\_\_\_  
and was amended on \_\_\_\_\_ (if applicable) or,

PCT International Application Number \_\_\_\_\_  
and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of  
the above identified specification, including the claims, as  
amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material  
to patentability as defined in Title 37, Code of Federal  
Regulations, § 1.56.

I hereby claim foreign priority under Title 35, United States Code  
§ 119 (a-d) or § 365(b) of any foreign application(s) for patent or  
inventor's certificate, or § 365(a) of any PCT international  
application which designated at least one country other than the  
United States, listed below. I have also identified below, by  
checking the "No" box, any foreign application for patent or  
inventor's certificate, or of any PCT international application  
having a filing date before that of the application on which priority  
is claimed:

☐ Additional foreign application numbers are listed  
on a supplemental priority sheet attached hereto.

## German Language Utility or Design Patent Application Declaration

Ich beanspruche hiermit Prioritätsvorteile unter Title 35, US-Code, § 119(e) aller US-Hilfsanmeldungen wie unten aufgezählt.

(Application Number)  
(Aktenzeichen)

(Application Number)  
(Aktenzeichen)

(Application Number)  
(Aktenzeichen)

- ☐ Zusätzliche einstweilige Anwendungsnummern sind im ergänzenden Prioritätsanhang aufgeführt.

Ich beanspruche hiermit die mir unter Title 35, US-Code, § 120 zustehenden Vorteile aller unten aufgeführten US-Patentanmeldungen bzw. § 365(c) aller PCT internationalen Anmeldungen, welche die Vereinigten Staaten von Amerika benennen, und erkenne, insofern der Gegenstand eines jeden früheren Anspruchs dieser Patentanmeldung nicht in einer US-Patentanmeldung, bzw. PCT internationalen Anmeldung in in einer gemäß dem ersten Absatz von Title 35, US-Code, § 112 vorgeschriebenen Art und Weise offenbart wurde, meine Pflicht zur Offenbarung jeglicher Informationen an, die zur Prüfung der Patentfähigkeit in Einklang mit Title 37, Code of Federal Regulations, § 1.56 von Belang sind und die im Zeitraum zwischen dem Anmeldetag der früheren Patentanmeldung und dem nationalen oder im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT) gültigen internationalen Anmeldetags bekannt geworden sind.

(Application No.)  
(Aktenzeichen)

(Day/Month/Year Filed)  
(Tag/Monat/Jahr eingereicht)

(Application No.)  
(Aktenzeichen)

(Day/Month/Year Filed)  
(Tag/Monat/Jahr eingereicht)

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Ich erkläre hiermit, daß alle in der vorliegenden Erklärung von mir gemachte Angaben nach bestem Wissen und Gewissen der Wahrheit entsprechen, und ferner daß ich diese eidesstattliche Erklärung in Kenntnis dessen ablege, daß wissentlich und vorsätzlich falsche Angaben oder dergleichen gemäß § 1001, Title 18 des US-Code strafbar sind und mit Geldstrafe und/oder Gefängnis bestraft werden können und daß derartige wissentlich und vorsätzlich falsche Angaben die Rechtswirksamkeit der vorliegenden Patentanmeldung oder eines aufgrund deren erteilten Patentes gefährden können.

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I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

(Day/Month/Year Filed)  
(Tag/Monat/Jahr der Anmeldung)

(Day/Month/Year Filed)  
(Tag/Monat/Jahr der Anmeldung)

(Day/Month/Year Filed)  
(Tag/Monat/Jahr der Anmeldung)

- ☐ Additional provisional application numbers are listed on a supplemental priority sheet attached hereto.

I hereby claim the benefit under Title 35, United States Code § 120 of any United States application(s), or § 365(c) of any PCT international application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

(Status)  
(patentiert, schwebend, aufgegeben)  
(patented, pending, abandoned)

(Status)  
(patentiert, schwebend, aufgegeben)  
(patented, pending, abandoned)

- ☐ Additional U.S. or international application numbers are listed on a supplemental priority sheet attached hereto.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

The undersigned hereby authorizes the U.S. attorney or agent named herein to accept and follow instructions from either his foreign patent agent or corporate representative, if any, as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

# German Language Utility or Design Patent Application Declaration

**VERTRETUNGSVOLLMACHT:** Als benannter Erfinder beauftrage ich hiermit den (die) nachstehend aufgeführten Patentanwalt (Patentanwälte) und/oder Vertreter mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Angelegenheiten vor dem US-Patent- und Markenamt: (Name(n) und Registrationsnummer(n) auflisten)

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: (list name and registration number)

**KUNDENNUMMER 7055**

**CUSTOMER NUMBER 7055**

Die ernannten Patenanwälte sind zur Zeit:

The appointed attorneys presently include:

Neil F. Greenblum  
Bruce H. Bernstein  
James L. Rowland  
Arnold Turk

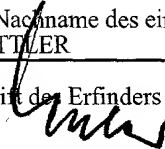
Reg. No. 28,394  
Reg. No. 29,027  
Reg. No. 32,674  
Reg. No. 33,094

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| Unterschrift des Erfinders<br> | Datum<br>x 15.5.2000 | Inventor's signature<br>x Heinz Kettler                                              | Date<br>x 18.5.2000 |
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| Unterschrift des zweiten Erfinders                                                                                | Datum                | Second Inventor's Signature                                                          | Date                |
| Wohnsitz                                                                                                          |                      | Residence                                                                            |                     |
| Staatsangehörigkeit                                                                                               |                      | Citizenship                                                                          |                     |
| Postanschrift                                                                                                     |                      | Post Office Address                                                                  |                     |
| (Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).    |                      | (Supply similar information and signature for third and subsequent joint inventors). |                     |